Accordingly, applicant's claims are amended as listed below.

IN THE CLAIMS

Claim1 (*currently amended*): A holographic image corrector comprising, a microscope which has,

a) an optical system having an objective and an imaging lens spaced therefrom,

b) at least one pinhole mounted before said objective,

c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom and through said imaging lens to form an object beam,

d) means for intersecting said object beam with a reference laser beam in a recording medium to form a hologram of said objective, said laser beams being coherent,

e) means to replace said pinhole with an article and

f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and through said imaging lens and diffracts through or off said hologram and provides a corrected image of said article for viewing.

Claim 2 (*currently amended*): A holographic image corrector comprising, a microscope which has,

a) an optical system having an objective and an imaging lens spaced therefrom,

b) a pinhole mounted before said objective,

c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom and through said imaging lens to form an object beam,

d) means for intersecting said object beam with a reference coherent laser beam in a recording medium to form a hologram of said objective,

e) means to replace said pinhole with an article and

f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and through said imaging lens and diffracts through or off said hologram and provides a corrected image of said article for viewing.

Claim 3 (*original*): The image corrector of claim 2 wherein said objective is a lens.

Claim 4 (*original*): The image corrector of claim 2 wherein said objective is a concave mirror.

Claim 5 (*original*): The image corrector of claim 4 wherein said mirror is tilted to an off-axis position.

Claim 6 (*original*): The image corrector of claim 2 wherein said pinhole is a spatial filter mounted before said objective and means for sending said first coherent beam through said spatial filter and thence through said objective.

Claim 7 (*original*): The image corrector of claim 2 wherein said optical system is at a working distance from said article of up to 10 in. or more.

Claim 8 (*original*): The image corrector of claim 2 wherein said objective is up to 8 in. or more in diameter.

Claims 9-11 (*canceled*)

Claim 12 (*previously presented*): The image corrector of claim 2 wherein said pinhole is replaced by a first spatial filter mounted before said objective and a second spatial filter is mounted in the path of the reference beam before it interferes with said object beam and means to replace said first spatial filter with an article in the manner of step e) of claim 2.

Claim 13 (*original*): The image corrector of claim 2 wherein said objective is selected from the group consisting of a mirror, a lens, a fresnel lens and a zone plate.

Claim 14 (*original*): The image corrector of claim 2 employed for viewing objects at a distance including those inside a vacuum system or in an gaseous atmosphere.

Claim 15 (*previously presented*): A method for image correction comprising, in a microscope,

a) recording the characteristics of an optical system having an objective, by sending a first laser beam through a pinhole and through said objective or reflecting said first beam therefrom and then through an imaging lens spaced therefrom to form an object beam,

b) intersecting said object beam with a reference coherent laser beam in a recording medium to form an interference pattern or hologram thereof,

c) replacing said pinhole with an article and

d) illuminating said article with a beam of the same wavelength as said laser beams, so that light therefrom passes through or reflects off said objective and through said

imaging lens and diffracts through or off said hologram, to provide a corrected image of said article.

Claim 16 (*previously presented*): The method of claim 15 employing said objective at a working distance of at least 10 in. from said article.

Claim 17 (*original*): The method of claim 15 wherein the object beam is passed through at least one pinhole and then through the objective and the reference beam is passed through at least one pinhole before interfering with said object beam.

Claim 18 (*previously presented*): A method for image correction comprising, in a microscope,

a) passing a laser beam through a beam splitter to form separate coherent beams 1&2,

b) directing beam 1 through a first pinhole to illuminate an objective and pass through an imaging lens spaced therefrom to define an object beam,

c) directing beam 2 through a second pinhole and through a collimating lens to define a reference beam and then into interference with said object beam in a recording medium to define a hologram,

d) removing said first pinhole before said objective and replacing said pinhole with an article to be viewed and

e) illuminating said article by a beam of the same wavelength as said coherent beams so that light therefrom passes through or reflects off said objective and through said imaging lens to diffract through or off said hologram to reconstruct the original reference beam but with article information retained, to correct for defects in said objective and to provide an accurate image for viewing.

Claim 19 (*currently amended*): A corrective hologram maker comprising,

a microscope which has

a) an optical system having an objective and an imaging lens spaced therefrom,

b) a pinhole mounted before said objective,

c) means for recording the characteristics of said objective by sending a first laser beam through said pinhole and through said objective or reflecting said beam therefrom and through said imaging lens to form an object beam and

d) means for intersecting said object beam with a reference coherent beam in a recording medium to form a hologram thereof that can correct for defects in said objective.

Claim 20 (*previously presented*): A method for making a hologram comprising, in a microscope,

a) recording the characteristics of an optical system having an objective, by sending a first coherent beam through a pinhole and through said objective or reflecting a first beam therefrom and then through an imaging lens spaced therefrom to form an object beam and

b) intersecting said object beam with a reference coherent beam in a recording medium to form an interference pattern or hologram thereof that can correct for defects in said objective.

Claim 21 (*currently amended*): A holographic image corrector comprising,

a microscope which has

a) an optical system having an objective and an imaging lens spaced therefrom,

b) an array of pinholes mounted before said objective,

c) means for recording the characteristics of said objective by sending a first laser beam through said array and through said objective or reflecting said beam therefrom and through said imaging lens to form an object beam,

d) means for intersecting said object beam with a reference coherent laser beam in a recording medium to form a hologram of said objective,

e) means to replace said array with an article and

f) means to illuminate said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and through said imaging lens and diffracts through or off said hologram and provides a corrected image of said article for viewing.

Claim 22 (*original*): The image corrector of claim 21 wherein said objective is a lens.

Claim 23 (*original*): The image corrector of claim 21 wherein said objective is a concave mirror.

Claim 24 (*original*): The image corrector of claim 23 wherein said mirror is tilted to an off-axis position.

Claim 25 (*original*): The image corrector of claim 21 wherein said optical system is at a working distance from said article of up to 10 in. or more.

Claim 26 (*original*): The image corrector of claim 21 wherein said objective is up to 8 in. or more in diameter.

Claims 27-28 (canceled)

Claim 29 (*original*): The image corrector of claim 21 wherein a first array of pinholes is mounted before said objective and a second array of pinholes is mounted in the path of the reference beam before it interferes with said object beam.

Claim 30 (*original*): The image corrector of claim 21 wherein said objective is selected from the group consisting of a mirror, a lens, a fresnel lens and a zone plate.

Claim 31 (*original*): The image corrector of claim 25 employed for viewing objects at a distance including those inside a vacuum system or in an unstable atmosphere.

Claim 32 (*previously presented*): A method for image correction comprising, in a microscope,

a) recording the characteristics of an optical system having an objective, by sending a first laser beam through an array of pinholes and through said objective or reflecting said first beam therefrom and then through an imaging lens, spaced from said objective, to form an object beam,

b) intersecting said object beam with a reference laser beam in a recording medium to form an interference pattern or hologram thereof,

c) replacing said array with an article and

d) illuminating said article with a beam of the same wavelength as said laser beams so that light therefrom passes through or reflects off said objective and through said imaging lens and diffracts through or off said hologram, to provide a corrected image of said article.

Claim 33 (*previously presented*): The method of claim 32 employing said objective at a working distance of at least 10 in. from said article.

Claim 34 (*original*): The method of claim 32 wherein said object beam is passed through an array of pinholes to illuminate the objective and the reference beam is passed through an array of pinholes before interfering with said object beam.

Claim 35 (*original*): The method of claim 32 wherein said object beam and said reference beam are each passed through a pinhole array to obtain a microscope of relatively large field of view.

Claim 36 (*previously presented*): The method of claim 32 wherein during step d) thereof, said reference beam is also directed at such hologram as before, to form an additional interference pattern of light and dark fringes superimposed on said image, to provide a contour plot thereof.

Claim 37 (*previously presented*): A method for image correction comprising, in a microscope,

a) passing a laser beam through a beam splitter to form separate beams 1 & 2,

b) directing beam 1 through a first array of pinholes to illuminate an objective and through an imaging lens, spaced from said objective, to define an object beam,

c) directing beam 2 through a second array of pinholes to a collimating lens to define a reference beam and then into interference with said object beam in a recording medium to define a hologram,

d) removing said first array of pinholes and replacing said pinhole array with an article to be viewed and

e) illuminating said article by a beam of the same wavelength as said laser beam so that light therefrom passes through or reflects off said objective and through said imagining lens to diffract through or off said hologram to reconstruct the original reference beam but with article information retained, to correct for defects in said objective and to provide an accurate image for viewing.

Claim 38 (*previously presented*): A holographic image corrector comprising, in a microscope,

a) an optical system having an objective and an imaging lens spaced therefrom,

b) an array of pinholes mounted before said objective,

c) means for recording the characteristics of said objective by sending a first laser beam though said array, through said objective or reflecting said beam therefrom and through said imaging lens to form an object beam and

d) means for intersecting said object beam with a reference coherent beam in a recording medium to form a hologram thereof that can correct for defects in said objective.

Claim 39 (*previously presented*): A method for objective correction comprising, in a microscope,

a) recording the characteristics of an optical system having an objective by sending a first laser beam through an array of pinholes and through said objective or reflecting said first beam therefrom and through an imaging lens, spaced from said objective to form an object beam and

b) intersecting said object beam with a reference coherent beam in a recording medium to form an interference pattern or hologram thereof that can correct for defects in said objective.

Claim 40 (*new*) :A new use for holographic image correction comprising, a method for image correction in a microscope having the steps of

a) recording the characteristics of an optical system having an objective, by sending a first laser beam through a pinhole and through said objective or reflecting said first beam therefrom and then through an imaging lens spaced therefrom to form an object beam,

b) intersecting said object beam with a reference coherent laser beam in a recording medium to form an interference pattern or hologram thereof,

c) replacing said pinhole with an article and

d) illuminating said article with a beam of the same wavelength as said laser beams, so that light therefrom passes through or reflects off said objective and through said imaging lens and diffracts through or off said hologram, to provide a corrected image of said article.

Claim 41(*new*) :The method of claim 40 wherein said pinhole is replaced with an array of pinholes.